

Name: _____

Date: _____

Exam: Function Reflections (Solution version 49)

1. Let function f be defined by the polynomial below:

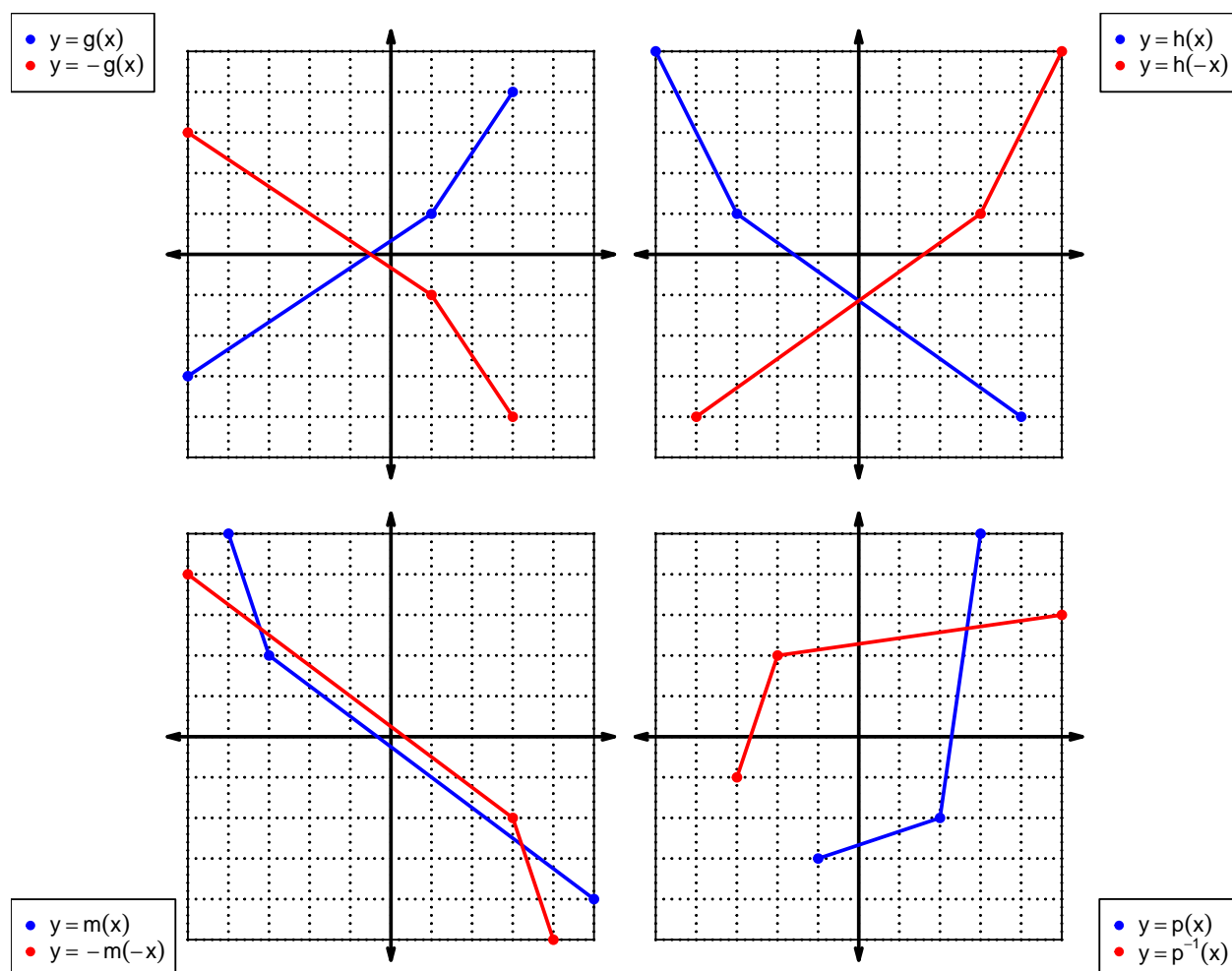
$$f(x) = 6x^4 + 4x^3 - 2x^2 - 8x + 9$$

Draw lines that match each function reflection with its polynomial:

Reflections**Polynomials**

$-f(-x)$	•	•	$6x^4 - 4x^3 - 2x^2 + 8x + 9$
$f(-x)$	•	•	$-6x^4 - 4x^3 + 2x^2 + 8x - 9$
$-f(x)$	•	•	$-6x^4 + 4x^3 + 2x^2 - 8x - 9$

2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f , g , and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	4	2	8
2	3	4	7
3	9	9	5
4	7	8	3
5	6	5	4
6	8	6	2
7	1	3	6
8	2	7	9
9	5	1	1

3. Evaluate $f(1)$.

$$f(1) = 4$$

4. Evaluate $g^{-1}(7)$.

$$g^{-1}(7) = 8$$

5. Assuming h is an **odd** function, evaluate $h(-5)$.

If function h is odd, then

$$h(-5) = -4$$

6. Assuming g is an **even** function, evaluate $g(-2)$.

If function g is even, then

$$g(-2) = 4$$

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7. A function, f , is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g , is **odd** if $g(x) = -g(-x)$ for all x in the domain.

Let polynomial p be defined with the following equation:

$$p(x) = -x^2 + 1$$

- a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = -(-x)^2 + 1$$

$$p(-x) = -x^2 + 1$$

- b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -(-x^2 + 1)$$

$$-p(-x) = x^2 - 1$$

- c. Is polynomial p even, odd, or neither?

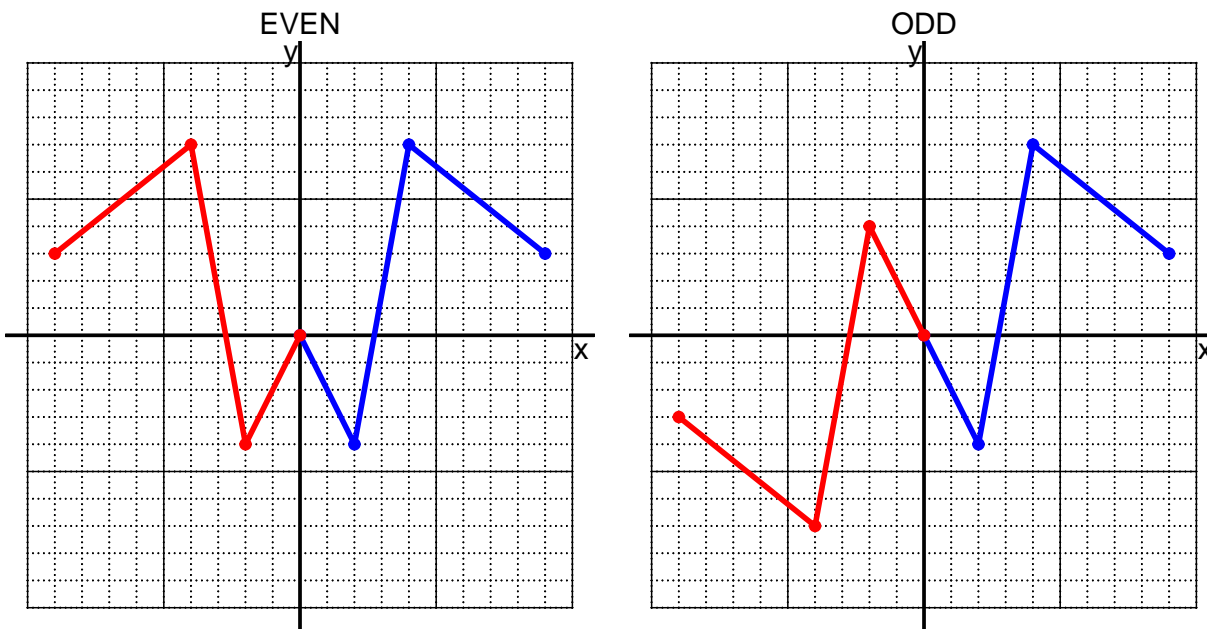
even

- d. Explain how you know the answer to part c.

We see that $p(x) = p(-x)$ for all x because $p(x)$ and $p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an even function.

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8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = \frac{x - 4}{7}$$

a. Evaluate $f(81)$.

step 1: subtract 4
step 2: divide by 7

$$\begin{aligned} f(81) &= \frac{(81) - 4}{7} \\ f(81) &= 11 \end{aligned}$$

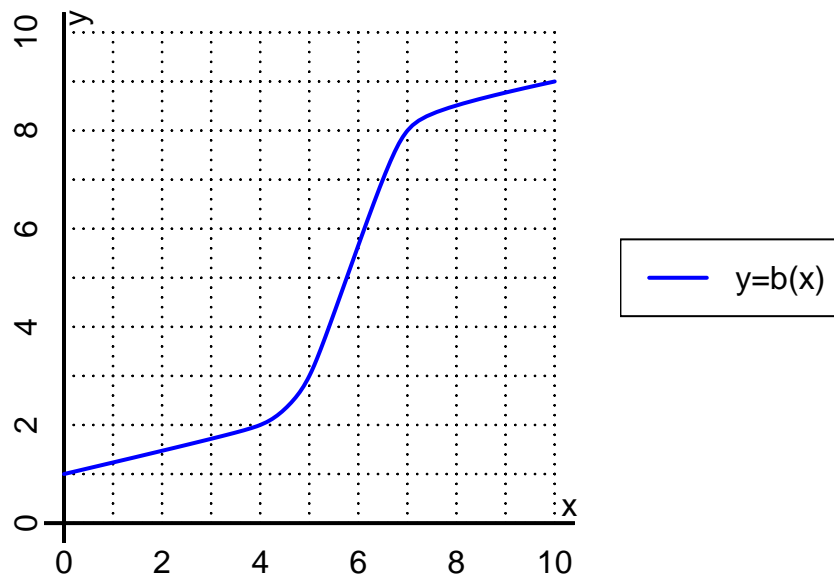
b. Evaluate $f^{-1}(13)$.

step 1: multiply by 7
step 2: add 4

$$\begin{aligned} f^{-1}(x) &= 7x + 4 \\ f^{-1}(13) &= 7(13) + 4 \\ f^{-1}(13) &= 95 \end{aligned}$$

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10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(7)$.

$$b(7) = 8$$

b. Evaluate $b^{-1}(2)$.

$$b^{-1}(2) = 4$$

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11. Function f is defined by the table below.

a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	5	-5	-5	5
-1	-7	7	7	-7
0	0	0	0	0
1	7	-7	-7	7
2	-5	5	5	-5

b. Is function f even, odd, or neither?

odd

c. How do you know the answer to part b?

Function f is odd because column $-f(-x)$ matches column $f(x)$ exactly.